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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,076	03/12/2004	Robert C. Schucker	18056/101306-00	8531

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Jones, Walker, Waechter, Poitevent,
Carrere & Dengre, L.L.P.
4th Floor
8555 United Plaza Boulevard
Baton Rouge, LA 70809

EXAMINER

YUAN, DAH WEI D

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 08/16/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/799,076

Applicant(s)

SCHUCKER, ROBERT C.

Examiner

Dah-Wei D. Yuan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 July 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-21 and 26-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-21 and 26-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>05272004</u> . | 6) <input type="checkbox"/> Other: _____ |

THIN FILM COMPOSITE ELECTROLYTE

Examiner: Yuan S.N. 10/799,076 Art Unit: 1745 August 4, 2006

Election/Restrictions

1. Applicant's election without traverse of Group II, claims 10-21, in Paper filed July 3, 2006 is acknowledged. Claims 1-9,22-23 were canceled. Claims 26-34 were added.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 10-21,26-34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. The term "suitable" in claim 10 is a relative term which render the claims indefinite. The term "suitable" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 10-21,26-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joshi et al. (US 5,290,405) in view of Futaki et al. (JP 2-199076) and Balagopal et al. (US 5,580,430).

With respect to claims 10,18,28,29 Joshi et al. teach a process of forming a three layered composite electrolyte comprising tape casting of a dense NASICON membrane disposed between two porous NASICON plates. See Column 4, Lines 32-57. However, Joshi et al. do not teach the use of pore former material in the two porous NASICON plates. Futaki et al. teach a process to make porous ceramic material by adding pore-forming material, such as crushed rice hull or wood flour, to the mixture. The resulting ceramic material has high strength and excellent impact resistance and toughness. See Abstract. Therefore, it would have been obvious to one of ordinary skill in the art to add pore-forming material to the NASICON substrate of Joshi et al., because Futaki et al. teach the resulting mechanical properties of the porous ceramic material can be enhanced.

Furthermore, Joshi et al. and Futaki et al. do not teach the sintering of the laminated composite electrolyte at elevated temperatures. Balagopal et al. teach a laminated NASICON composite electrolyte, wherein the electrolyte is sintered at various temperatures to achieve good ionic conductivity. See Column 11, Lines 22-43. Therefore, it would have been obvious to one of ordinary skill in the art to sinter the laminated composite electrolyte of Joshi and Futaki at elevated temperatures, because Balagopal et al. teach good ionic conductivity of the electrolyte can be obtained from the sintering operation.

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With respect to claims 11,12, Balagopal et al. teach the sintering temperatures are below 1500°C. See Table 1.

With respect to claim 13, Balagopal et al. do not teach the use of encapsulation during sintering 1500°C. See Table 1.

With respect to claims 14-16,31-34, Balagopal do not specifically disclose the sintering steps in the process. However, Balagopal et al. recognize the density and phase equilibrium of the ceramic electrolyte are determined by the sintering temperature and hold time. See Column 11, Lines 13-43. Therefore, it would have been within the skill of the ordinary artisan to adjust the sintering schedule of the laminated electrolyte in order to yield optimum density and microstructure. *Discovery of optimum value of result effective variable in known process is ordinarily within skill of art.* In re Boesch, CCPA 1980, 617 F.2d 272, 205 USPQ215.

With respect to claim 17, Joshi et al. teach the electrolyte can comprise beta-alumina. See Column 5, Lines 1-10.

With respect to claims 19,20,30, Joshi et al. teach the thickness of the laminate is about 25 µm. See Column 4, Lines 43-57.

With respect to claim 21, Joshi et al. teach the dense membrane is supported by two porous thin plates. See Column 4, Lines 32-42.

With respect to claims 26,27, Joshi et al. do not specifically disclose the addition of a binder a plasticizer in the manufacturing of the composite electrolyte. Nevertheless, it is well known in the art that binder and plasticizer are necessarily present in the tape casting process as evidenced by J.S. Reed, "Introduction to the Principles of Ceramic Processing", page 397. A

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reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature *is necessarily present in that which is described in the reference*. In re Robertson, 49 USPQ2d 1949 (1999).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dah-Wei D. Yuan whose telephone number is (571) 272-1295. The examiner can normally be reached on Monday-Friday (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dah-Wei D. Yuan
August 4, 2006



DAH-WEI YUAN
PRIMARY EXAMINER